

## 9.1 Power Series

Infinite Series  $\sum_{k=1}^{\infty} a_n$

Partial Sum  $\sum_{k=1}^n a_n$

Does the series  $3/10 + 3/100 + 3/1000 + \dots$  converge or diverge?

Jan 25-11:33 AM

Infinite Geometric Series  $\sum_{n=1}^{\infty} ar^{n-1}$

Tell whether each series converges or diverges. If it converges, give its sum.

$$\sum_{n=1}^{\infty} 3\left(\frac{1}{2}\right)^{n-1}$$

$$1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \dots$$

$$\sum_{k=0}^{\infty} \left(\frac{3}{5}\right)^k$$

Jan 25-11:38 AM

Find the function that is equal to the series. Support graphically.

$$1 + x + x^2 + x^3 + \dots + x^n + \dots$$

Jan 25-11:45 AM

Power Series

centered at  $x=0$ :  $\sum_{n=0}^{\infty} c_n x^n$

centered at  $x=a$ :  $\sum_{n=0}^{\infty} c_n (x-a)^n$

Jan 25-11:48 AM

Find power series for the following functions

$$f(x) = \frac{1}{1+x}$$

$$f(x) = \frac{1}{x}$$

Hint:  $\frac{1}{x} = \frac{1}{1+(x-1)}$

Jan 25-11:55 AM

Differentiate the power series for  $\frac{1}{1-x}$

What function equals this new power series?

Jan 25-11:58 AM

Use the power series for  $\frac{1}{1+x}$  to find a power series for  $\ln(1+x)$

Jan 25-12:00 PM

Find a power series for  $\frac{1}{1+x^2}$   
and use that series to find one for  $\tan^{-1} x$

Jan 25-12:01 PM